

Documentation of Safe Work Practices

DRAFT

Los Alamos National Laboratory

Laboratory Implementation Requirements LIR300-00-02.234

Issue Date: August 19, 1998 (Revised July 10, 2001) April 3

Mandatory Document

1.0 Introduction

1.1 Background

“Safe Work Practices” (LIR300-00-01) requires that the hazard control system established to mitigate the environment, safety, health, and property risks associated with work be effectively communicated to all of the workers engaged in the work and to other affected people. This requires documentation so that the reader understands the need for and the use of each of the controls in the context of the work. When new controls are developed or existing controls are modified to achieve acceptable risk, the required document is called a hazard control plan, as specified by LIR300-00-01.

The hazard control plan must include estimates of the initial risk being mitigated and the residual risk with the controls in place to determine the rigor of review and level of authorization required. For high and medium initial risk, the individuals who must review the control system must also be identified in the document. Additional review and documentation in the form of permits is required for special types of work. Approval of the hazard control plan by the level of supervision or line management appropriate to the level of residual risk constitutes authorization for the defined work. Authorization of workers engaged in low- or medium-residual-risk work must also be documented by their line manager.

See Attachment 2 (Guidance) for Recommended Major Implementation Criteria for Self-Assessment.

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2.0 Purpose

The purpose of this document is to define the minimum documentation required for Safe Work Practices at Los Alamos National Laboratory (Laboratory).

3.0 Scope

This document specifies the content requirements of hazard control plans and the documentation required for review(s) of the hazard control system and authorization of work and workers. Other Laboratory requirements specify additional documentation necessary for specific types of work, as summarized in Attachment 1. The provisions of this document apply to all Laboratory employees, contractor and subcontractor employees, and visitors who perform non-facility-related work at the Laboratory. This document supersedes AR 1-3, "Safe Operating Procedures and Special Work Permits."

Revisions to this LIR that specify changes in Safe Work Practice documentation requirements are immediately applicable to new activities and take effect at the next scheduled review of the documentation for activities that predate the revision. Such revisions are indicated by a superscript at the end of the change.² (For example, the preceding superscript corresponds to revision 2.)

4.0 Definitions

4.1 Terms

acceptable risk—The level at which the benefits of the work outweigh the risk posed, and the risk is reduced to a level as low as is reasonably achievable.

administrative control—A method such as a procedure, permit, sign, access restriction, time limitation, or training that directs, restricts, or modifies people's behavior.

authorization— The acceptance and approval by the appropriate level of supervision of (1) the adequacy of the control system [work authorization] or (2) a specific worker's knowledge, skills, and abilities to perform the work safely [worker authorization].

change-control process—A process by which changes in configurations or procedures are appropriately documented and communicated to affected personnel.

control—A method or means used to mitigate hazards and reduce risk.

elimination—The removal of a hazardous material, condition, or process.

engineering control—A structural or mechanical device or system such as a fume hood, glove box, ventilation system, interlock, shielding, or remote handling.

environment, safety, and health (ES&H) subject-matter expert—Any individual with academic credentials, work experience, or extensive knowledge in an ES&H discipline (for example, industrial hygiene, industrial safety, health physics, or environmental protection) or in controlling the specific hazards associated with the defined work.

equivalent position—A supervisory or management position with comparable responsibilities and authorities. For example, a Center Leader is an equivalent position to a Group Leader.

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4.1 Terms (continued)

facility work—Any combination of engineering, procurement, erection, installation, assembly, disassembly, or fabrication activities involved in creating a new facility or in maintaining, altering, adding to, decontaminating, decommissioning, or rehabilitating an existing facility (as defined in LIR230-03-01, “Facility Management Work Control”).

hazard—Any source or situation with potential to cause injury or harm to workers or the public, harm to the environment or incurred liability, or damage to or loss of property.

hazard control plan—A document that, at a minimum, defines the work, identifies the hazards associated with the work, and describes the controls needed to reduce the risk posed by the work to an acceptable level. (The hazard control plan may include detailed operating instructions, but the hazard control information must be clearly delineated.)

hazard control system—The combination of controls established to reduce the risk posed by the work to an acceptable level.

Independent peer – An individual who is familiar and knowledgeable about the specific type of work being done and the associated hazards with that type of work but who was not involved with the hazard evaluation or the development of controls and is not directly involved with performing the work. This independence is important for providing a critical and unbiased review of the adequacy of the hazard identification and evaluation and the controls employed to mitigate those hazards.

initial risk—The risk before controls are established and in place, or the risk posed by hazards that have not been adequately controlled; for activities with established control systems, the risk before Laboratory-instituted controls are implemented, or the risk posed because of the likelihood of failure of the established controls.

line manager—Any formally designated manager, such as a group leader or division director, who is responsible for Laboratory workers’ terms and conditions of employment.

personal protective equipment—Protective devices such as gloves, coveralls, safety shoes, respirators, safety glasses, or earplugs worn by the workers.

residual risk—The risk remaining after controls are in place, with consideration of the reliability and certainty of the controls and the risk of control failure.

risk—A function of the likelihood and potential severity of injury, harm, incurred liability, damage, or loss; for the purpose of this document, a qualitative judgment based on knowledge and experience. (Risk is categorized as high, medium, low, and minimal, per the matrix in LIR300-00-01.)

substitution—The replacement of a hazardous material, condition, or process with a less hazardous material, condition, or process.

supervisor—Any individual, such as a team leader, group leader, or division director, with the authority and responsibility to direct and authorize the activities of workers.

worker—Any Laboratory employee; any contract employee, subcontract employee, or visitor, while performing work at the Laboratory.

5.0 Implementing Requirements

5.1 Documentation and Retention of Hazard Analyses

5.1.1 Hazard Analysis Documentation. For activities in which the hazards could potentially pose high or medium initial risk, documentation of the hazard evaluation performed to consider accident scenarios and determine initial risk is required and must be retained. Similarly analyses performed to select or design controls or to determine the effectiveness and reliability of these controls must be retained. These records provide a foundation for modifying or improving the control system and a valuable reference for future users of the controls. For new activities, this documentation must be prepared prior to authorization. For existing activities with high or medium initial risk, if it does not already exist, this documentation must be prepared prior to the next authorization review date.

Note: *There is no general requirement on the form or content of the evaluation or analyses unless specified by another requirement or regulation. For example AR8-1 requires use of a Confined Space Evaluation form or 29CFR1910.119 for “highly hazardous chemicals” specifies a choice of methodology and make-up of the analysis team. At a minimum the evaluation or analyses should be legible and appropriate to the activity.*

5.2 Documentation of Hazard Control Plans

5.2.1 When to Write a Hazard Control Plan. Hazard control plans must be written, at a minimum, when new controls are developed, when existing controls are modified, or when established documentation is not adequate to communicate the hazards posed by the work and the controls and their use to workers and other affected people.

Note: *When existing controls reduce the risk to an acceptable level, operating manuals or other established documents that govern the use of the equipment or process of the work provide sufficient documentation. This applies to commercial equipment and Laboratory control systems that have been previously established and reviewed.*

For activities that rely on an authorization basis document (such as a Final Safety Analysis Report [FSAR], Safety Assessment [SA], Basis for Interim Operation [BIO] or Facility Safety Plan) to describe relevant hazards and controls, hazard control plans must reference the relevant sections of these documents and provide the additional information, consistent with LIR 300.00.01, that the worker needs to do the work safely. For existing hazard control plans, these references, if needed, must be included by the next authorization review date.

5.2.2 Writing Hazard Control Plans. Hazard control plans must be prepared, and revised as needed, by personnel who are knowledgeable and experienced in similar work.

5.2.3 Reviewing Hazard Control Plans. LIR300-00-01 requires that the hazard control system described in a hazard control plan be reviewed with a rigor commensurate with the initial risk.

When the initial risk is high, concurrence of independent peer(s) and ES&H subject-matter expert(s) is required. When the initial risk is medium, consultation with independent peer(s) or ES&H subject-matter expert(s) is required.

Modifications or improvements in the hazard control system resulting from these reviews must be incorporated in the hazard control plan. The name(s) of the reviewer(s) must be documented for consultation; the signature(s) (or equivalent means of authentication) of the reviewer(s) must be documented for concurrence.

5.2 Documentation of Hazard Control Plans (continued)

5.2.4 Approving Hazard Control Plans. Approval, by signature (or equivalent means of authentication), of a hazard control plan documents acceptance of the residual risk for the work, with the described controls in place, and constitutes authorization of the work.

For minimal residual risk, the responsible supervisor must authorize the work. For low residual risk, the responsible group leader, or equivalent, must authorize the work. For medium residual risk, the responsible division director, or equivalent, must authorize the work. As specified in LIR300-00-01, high-residual-risk work will not be authorized.

Note: *Individual organizations or facilities may require higher level authorization, depending on conditions such as management need, external drivers, or internal agreements.*

5.2.5 Content of Hazard Control Plans. The hazard control plan must contain the information necessary to communicate the hazards and how they are controlled for the defined work.

Note: *The hazard control plan may be a combination of documents, which contain the essential information, or may reference other documents, without reproducing them. When other documents are referenced, the source or method of access for the documents must be specified.*

For work involving hazards such as confined spaces; energized electrical exposure; excavation or fill; ionizing radiation; welding, cutting, or other spark/flame-production; special review and documentation with the appropriate work permit is required (see Attachment 1). A Laboratory-specific work permit that fully covers the work, the hazards, and the hazard control system can serve as the hazard control plan. Additional permits, sometimes from other agencies, may also be required for special classes of work such as hazardous materials shipment or certain types of field work.

Hazard Control Plan. The hazard control plan must contain the following (not necessarily in this order):

1. A description of the work covered by the plan, with sufficient detail for the reader to readily understand the context (for example, materials, equipment, interfaces, and locations) of the hazards and the controls established.
2. An identification of all the significant hazards, based on a systematic evaluation of the circumstances in which these hazards could cause harm in the context of the work being performed.
3. An estimate of the overall initial risk posed by these hazards and circumstances, per the LIR300-00-01 risk matrix, to determine the level of review required.

5.4. A listing of institutional, facility, or activity operational requirements or restrictions that are directly related to the defined work (for example, LIR402-400-01, "Lasers," for laser activities).

5. A description of controls (elimination, substitution, engineering controls, administrative controls, and/or personal protective equipment) that were developed or modified to achieve acceptable risk and that compose the hazard control system.

Note: *These controls may also include requirements for testing, materials, and other specifications.*

Continued on next page

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5.2 Documentation of Hazard Control Plans (continued)

6. A listing of any equipment status that is essential to safe operation and a description of how the required status can be verified.²
7. A description of the knowledge, skills, and abilities necessary to use the controls and to perform the work safely and the training, both formal and on-the-job, necessary to obtain the requisite knowledge and skills.
*Note: Hazard Control Plans for work performed in spaces or environments that are not under the direct daily control of the worker's line-management chain must include a requirement for workers to inform themselves of the FMU access control requirements and the site-specific hazards and controls and to comply with the hazard and access control requirements.*³
8. A description of wastes, or residual materials, produced (if any) and how they must be handled.
9. An estimate of the residual risk posed by the work with the defined control system in place, per the LIR300-00-01 risk matrix. This estimate must be based on an analysis, performed with a rigor commensurate with the level of initial risk, of potential failures of controls, equipment, utilities, facility systems, procedures, or human factors.
10. A description of emergency actions to be taken in the event of control failure or abnormal operation.
11. A description of or reference to the change control process to be used for changing the hazard control plan and notifying affected people of the changes.

Hazard Control Plan Cover Sheet. The hazard control plan cover sheet must contain the following information (not necessarily in this order):

1. The words "hazard control plan."
 2. Title or identifying description of the work.
 3. Identifying number or designator.
 4. Initial risk estimate.
 5. Name(s) of the reviewer(s) to indicate consultation on the defined hazard control system for medium-initial-risk activities, or signature(s) (or equivalent means of authentication) of the reviewer(s) to indicate concurrence with the control system for high-initial-risk activities.
 6. Identification of work permits required for the tasks described.
 7. Residual risk estimate.
 8. Name and contact information of the (principal) author.
 9. Next authorization review date.
 10. Name, title, and signature (or equivalent means of authentication) of authorizer (per LIR300-00-01) and effective authorization date.
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5.2 Documentation of Hazard Control Plans (continued)

5.2.6 Revision and Renewal of Hazard Control Plans. Existing hazard control plans must be reviewed for adequacy and currency, by the appropriate level supervisor or line manager as specified in LIR 300.00.01, on or before the next authorization review date specified on the cover sheet.

Changes in the hazard control system must be reviewed by the appropriate independent peer(s) and/or ES&H subject-matter expert(s), as required in LIR300-00-01 for the level of risk. Changes made and reviews performed must be documented, and the next review date must be established. The revised plan must be distributed to affected workers and other affected people, using the organization's established change control process.

If no changes are required, the next review date must be established, and the plan must be reapproved by the responsible supervisor or line manager (at the level determined by the residual risk) and distributed or made accessible to the affected people.

5.3 Documentation of Authorizations

5.3.1 Authorization of Work. Authorization of work is based on the residual risk of the work.

- For work covered by a hazard control plan, authorization is documented by the signature of the responsible supervisor or line manager on the hazard control plan cover sheet.
- When a hazard control system is adequately documented and approved by the responsible supervisor or line manager or by a recognized authority, such as UL listing of commercial equipment or a Laboratory requirements document, additional documentation of work authorization is not required.

5.3.2 Authorization of Workers. Authorization of workers to perform defined work is based on their having the knowledge, skills, and abilities to perform the work safely.

- For workers engaged in low- or medium-residual-risk work, authorization may be granted only by their line manager and must be documented.
- When Laboratory or other agency certification, training, or permit is required as a condition for authorization, such requirements must be documented.

Note: *Authorization records, when required, may be in the form of authorization lists attached to hazard control plans or maintained in central or distributed files, or in other forms.*

5.4 Inventory of Work Activities

5.4.1 Inventory Requirements. Each organization must document and maintain an inventory of its work activities. This inventory must include, at a minimum, all activities for which the initial risk is high or medium and all activities for which the residual risk is medium or low.

For each such activity, the inventory must record a distinct name or description to identify the work, sufficient information to determine where the work is or will be performed, and the authorization status of the work.

Note: *Consider including an identifying number or designator, the name of the person most knowledgeable about the work, the initial and residual risk estimates, the name of the person who authorized the work, the date the work was authorized, and the review period or next authorization due date.*

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6.0 References

6.1 Documents

“Safe Work Practices,” Los Alamos National Laboratory document LIR300-00-01.

“Confined Spaces,” Los Alamos National Laboratory document AR 8-1.

“Electrical Safety,” Los Alamos National Laboratory document LIR402-600-01.

“Excavation or Fill Permit Review,” Los Alamos National Laboratory document AR 1-12.

“Lockout/Tagout for Control of Hazardous Energy Sources for Personnel Safety (Red Lock Procedure),” Los Alamos National Laboratory document LP106-01.

“Welding, Cutting, and Other Spark-/Flame-Producing Operations,” Los Alamos National Laboratory document AR 8-4.

“Work Planning,” Los Alamos National Laboratory document LIR402-720-01.

6.2 Document Ownership

The Materials Science and Technology Division Office is the office of institutional coordination responsible for developing, revising, and maintaining the contents of this document.

7.0 Attachments

Attachment 1: Activities with Specific Hazard Control Documentation Requirements

Attachment 2: Recommended Major Implementation Criteria for Self-Assessment

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Attachment 1

Activities with Specific Hazard Control Documentation Requirements

(as of March 2001)

(Hazard control system documents, such as standard or safe operating procedures or special or safe work permits, referenced in existing Laboratory requirements documents, will eventually be replaced by the hazard control plan terminology.)

Work Description	Reference	Requirement Summary
Wearing personal protective equipment for radiological activities	Attachment J, Radiological Personal Protective Equipment, <i>Occupational Radiation Protection Requirements</i> (LIR402-700-01)	Requires additional documentation of personal protective equipment requirements for work in tritium areas.
Handling and storing sealed radioactive sources	Attachment P, Source Control, <i>Occupational Radiation Protection Requirements</i> (LIR402-700-01)	Requires facility-specific radiation safety hazard control documentation for ANSI N43.3-defined high-activity radioactive sealed sources.
Planning radiological activities	Attachment K, Work Planning, <i>Occupational Radiation Protection Requirements</i> (LIR402-700-01)	Specifies additional content, review, and approval for hazard control documentation of radiological work.
Activities involving x-ray-generating devices	Attachment R, X-Ray-Generating Devices and Facilities Control, <i>Occupational Radiation Protection Requirements</i> (LIR402-700-01)	Specifies additional content and review and when a hazard control documentation is required.
Energized electrical activities	<i>Electrical Safety</i> (LIR402-600-01)	Specifies additional content and review.
Lockout/tagout	<i>Lockout/Tagout for Personal Safety-Red Lock Procedure</i> (LIR402-860-01)	Specifies when a procedure is required.
Lockout/tagout	<i>Locking and Tagging Equipment, Machinery, and Systems</i> (LIR402-860-02)	Specifies when a procedure is required
Activities involving lasers	<i>Lasers</i> (LIR402-400-01)	Specifies an attachment.
Welding, cutting, other spark/flame-producing activities	<i>Welding, Cutting, and Other Spark-/Flame-Producing Operations</i> (AR 8-4)	Allows hazard control documentation to be used, instead of a permit, for repetitive operations.
Explosives	<i>Explosives</i> (LIR402-550-01)	Requires hazard control documentation for all explosives operations.
Activities involving hazardous gases (for example, flammable or toxic gases, asphyxiants)	<i>Chemical Management</i> (LIR402-510-01)	Specifies content and training documentation.
Activities involving cryogenic fluids	<i>Cryogenic Fluids or Cryogenics</i> (LIR402-580-01)	Specifies when hazard control documentation is required.
Activities that generate radioactive waste	<i>Packaging and Transportation</i> (LIR405-10-01)	Specifies requirements for content.
Activities that involve the use of respiratory protective equipment	<i>Personal Protective Equipment</i> (LIR402-1000-01) and Attachment J, Personal Protective Equipment, <i>Occupational Radiation Protection Requirements</i> (LIR402-700-01)	Specifies hazard control documentation and review.
Activities involving working alone	<i>Working Alone</i> (AR 1-8)	Allows hazard control documentation to be used to document working alone.

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Non-Mandatory Document

Guidance

Attachment 2

Recommended Major Implementation Criteria for Self-Assessment

(Non-Mandatory)

LIR Title	LIR Number
Documentation of Safe Work Practices	LIR 300-00-02.3

The major implementation criteria listed below are provided to assist Laboratory organizations assess their implementation of this LIR. These criteria provide an objective basis for self-assessing implementation of the major requirements contained in the LIR. The LIR also states requirements in other areas, such as, scope, precautions, and responsibilities that, when applied, complement the successful implementation of these major requirements.

- The most important criterion for assessing the implementation status of this LIR should be, if applicable: Have the requirements contained in the LIR been communicated to the individual(s) responsible for performing the work?**
- In addition, the recommended major implementation criteria for self-assessment of this LIR are the following:**
 - Hazard Control Plans (HCPs) are written when new controls are developed, when existing controls are modified, or when established documentation is not adequate to communicate the hazards posed by the work, the controls established, and the use of those controls to workers and other affected people (see section 5.1.1).
 - People knowledgeable and experienced in the work prepare HCPs (see section 5.1.2).
 - HCPs describe: the work, significant hazards, initial risks, applicable requirements, controls established, required worker qualifications, waste handling, residual risks, emergency actions, and change control process (see section 5.1.5).
 - HCP cover sheets contain the words "Hazard Control Plan," title or identifying description of the work, identifying number, initial risks, risk-based reviewers, identified work permits, residual risks, author, next review date, and risk-based authorizers (see section 5.1.5).
 - HCPs are up-to-date and provided to affected workers (see section 5.1.6).
 - The specific knowledge, skills, and abilities needed by a worker to perform the work safely is evaluated at least annually. Medium and low residual risk work is authorized by the responsible line manager and is documented (see section 5.2.2).
 - When Laboratory or other agency certification, training, or permit is required as a condition for authorization, such requirements are documented (see section 5.2.2).
 - A work inventory is documented and maintained for activities with high and medium initial risk, and medium and low residual risks (see section 5.3.1).